ORIGINAL ARTICLE

Report on 5641 outpatient abortions by vacuum suction curettage

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Summary: A technique of ambulatory abortion for first trimester pregnancies by vacuum suction curettage under local anesthesia with intracervical block is described. The apparatus and relevant problems are discussed. A shortened speculum devised by the author and considered an improvement for this procedure, and a simplified sterile field are described. The complication rate of 0.48% based on 5641 reported cases is very low: there were no deaths, two cases of uterine perforation, 14 of incomplete abortion, 20 of infection, 1 of depression, no cervical lacerations; 27 patients were hospitalized. The advantages of this method are safety, simplicity, minimal blood loss and immediate recovery. It is preferable to the usual dilatation and curettage, does not require general anesthesia and can be used in small clinics or in hospitals on an ambulatory basis.

Résumé: *Rapport sur 5641 avortements effectués par la méthode d'aspiration par le vide et curetage*

L'article décrit la technique d'avortement pratiquée durant le premier trimestre d'une grossesse par la méthode d'aspiration par le vide sous anesthésie locale intracervicale et décrit aussi l'équipement et les problèmes qui se rapportent à la méthode. L'auteur préconise un spéculum raccourci qu'il a mis au point et qu'il considère comme une amélioration de ladite méthode, ainsi que l'emploi d'un champ stérile plus simple. La proportion de complications notées sur les 5641 cas signalés est très faible (0.48%): on n'a enregistré aucun décès, mais on a observé deux cas de perforation utérine, 14 cas d'avortement incomplet, 20 cas d'infection, 1 cas de dépression mais par contre aucun cas de lacération cervicale. Vingt-sept femmes ont été hospitalisées. Parmi les avantages de ladite méthode, figurent la sécurité, la simplicité, la perte de sang minime et le rétablissement immédiat. Cette méthode est préférable à la méthode classique, par dilatation cervicale et curetage; elle n'exige pas d'anesthésie générale et peut être pratiquée sur des patientes ambulatoires, dans des hôpitaux, voire dans de petites cliniques.

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Since the liberalization of the abortion laws in Canada in August 1969, the number of abortions done in this country has increased steadily. Hospitals with liberal attitudes are swamped by demands for this service and limit the number of operations performed because of a shortage of beds. Many physicians still use the traditional dilatation and curettage technique under general anesthesia and keep the patient in hospital for a period of two or three days.

There is now a vast literature available which shows that the vacuum suction technique is preferable to curettage because it is cleaner, more efficient, faster, entails a significantly reduced blood loss and danger of perforation, and requires less dilatation of the cervix with decreased risk of subsequent cervical incompetence.[1-14] It may be done under general or local anesthesia and, especially with the latter, does not require hospitalization, thus reducing the demand for hospital beds.

The advantages of local anesthesia by intracervical or paracervical block have been noted by many authors: simplicity of administration, less blood loss, avoidance of complications, delays and costs of general anesthesia, reduced personnel and immediate recovery.[2,6,7,9-15]

This article reports the author's experience resulting from 5641 ambulatory abortions done in his clinic with the vacuum suction technique under local anesthesia.

Preoperative care

The cooperation of the conscious patient is essential to the success of the operation. Therefore reduction of anxiety, which sometimes borders on panic, in patients facing abortion is very important. A supportive attitude by the staff is of great help. It is important to offer reassurance by explaining the operation and by allaying specific anxieties such as fear of hemorrhage, excessive pain or later complications. The presence of a sympathetic woman attendant during the procedure is of great value in this regard. Anxious patients are instructed to take 5 or 10 mg. diazepam (Valium®) orally two hours prior to operation, and very anxious ones are given 10 mg. intramuscularly immediately before the procedure.

In the experience of the author the elaborate work-up and laboratory tests required in some centres prior to vacuum suction are a waste of time and money and cause unnecessary stress to the patient. The procedure is simple, blood loss minimal, recovery fast, and risk in experienced hands

so minimal that all that is necessary is recording of the pertinent gynecological history and a thorough pelvic examination. The only test considered of value at present is determination of the Rh factor in women eight or more weeks pregnant who might want to conceive subsequently, with a view to preventing isoimmunization by the administration of anti-D gamma globulin.

Patients are instructed to fast for three hours before the operation because of the possibility of nausea and vomiting; since they are not unconscious there is no danger of regurgitation into the respiratory tract.

Asepsis

A bath and vaginal douche before the operation are recommended. Vulvar shaving is not required.

A special technique was developed to ensure a sterile field with respect to pubic hair. From the sterilized pack of instruments one nurse selects a speculum wrapped in a square folded paper and protruding through it. The second nurse, standing at the side of the patient, spreads the labia minora by gentle lateral traction applied through sterile tampons as the speculum is introduced in such a way that it compresses the tampons on each side, eliminating pubic hair from the field of operation; the wrapped paper is then unfolded and a sterile field obtained. The cervix and surrounding vaginal area are swabbed with povidone-iodine (Betadine®). After applying a tenaculum the cervical canal is cleaned with the same solution.

The operator then dons sterile gloves and carefully avoids touching the peripheral non-sterile areas of the paper-covered field — this comes quite easily with a little practice. Masks for the physician and instrument nurse are routine.

Modified speculum

The weighted speculum cannot be used on a conscious patient since it hurts too much. The blades of the ordinary Graves speculum are too long and the diameter of the virgin speculum is too narrow. The author solved this problem by shortening the blades of the medium-sized Graves speculum to 3¼ inches; the instrument is then comfortable to the patient, permits good visualization, is wide enough in diameter for administration of local anesthesia, and allows the cervix to be pulled forward sufficiently to permit easier dilatation and evacuation. This modified speculum is used routinely; only rarely need others be employed (e. g. the virgin speculum in cases with an intact hymen, the ordinary length when the uterus is high up and cannot be visualized with the shortened speculum).

Anesthesia

The intracervical block

For local anesthesia 7 ml. of 2% lidocaine is used, to which is added 1/200 grain atropine. One ml. of this mixture is injected at 12 o'clock at the spot where the tenaculum is to be applied. The sound is then introduced to ascertain the length of the cervix, the direction of the cervical canal and the overall length of the uterine cavity. The sound or the Hegar no. 5 dilator then serves as a guide to the administration of the solution which is injected at 3 and 9 o'clock, 1 ml. at each of three equidistant points along a line parallel to and about 1 cm. distant from the cervical canal. It is the author's impression that the intracervical block as described is more accurate, permits easier dilatation of the cervix and provides better anesthesia than paracervical block.[10]

Nitrous oxide

For over a year now nitrous oxide (mixed with 70 to 90% oxygen) has been used as an adjunct to local anesthesia, not for its anesthetic effect, but to reduce anxiety and induce mild euphoria. The amount administered is easily controlled by the attending nurse using a nitrous oxide dispenser.* Nitrous oxide is well tolerated and does not increase blood loss even when employed as a general anesthetic.[11,16] It secures better patient cooperation and is of great value when anxiety is intense. The availability of instant oxygen is an added safety factor.

Dilatation

Dilatation of the cervix may proceed immediately after completion of the block with little discomfort or pain; if considerable pain is still present it may be advisable to wait for diffusion of the lidocaine or even to inject more of it.

Hegar dilators have regularly been used; when difficulty in overcoming resistance is encountered the use of half-sizes, in particular 8½ and 10½, by permitting more gradual dilatation, reduces the danger of perforation and damage to the cervix. Since the Hegar dilators correspond in size to the cannulas used, dilatation proceeds to the minimum extent necessary for introduction of a cannula of equal size.

Dilatation of a multiparous softened cervix presents no difficulty. In a pregnancy of less than six weeks' duration, especially in a nullipara, the cervix may be firm and difficult to dilate; more force is needed to open the internal os, with increased danger of perforation.[17] One way of avoiding this is to use a flexible cannula which requires minimal or no dilatation. When this is unsuccessful it may be advisable to postpone the procedure for two weeks to permit softening of the cervix.

The use of the Bierer II atraumatic tenaculum,** which has six small teeth and provides a good grip on the cervix, has practically eliminated cervical lacerations during dilatation. Only in the rare case of a thin tapered cervix need the one-toothed tenaculum be applied. Repositioning and tightening the grip on the cervix while dilatation progresses helps further to reduce risk of laceration.

Evacuation technique

The aspirator used† has been found excellent: it is powerful, capable of producing a negative pressure of one atmosphere (76 cm. Hg), and the rate of increase of the vacuum produced is rapid — uterine evacuation time is consequently reduced and blood loss significantly decreased. It may be used without difficulty up to 12 actual weeks of pregnancy (or about 14 weeks from the onset of the last menstrual period).

The Berkeley cannulas with bevelled ends (also called vacurettes) are made of a sturdy, thin, transparent plastic, permitting visual inspection of tissues during evacuation. Their diameters range from 8 to 12 mm.; straight and curved ones are available, as are flexible ones of 4, 5 and 6 mm. which may be used in very early pregnancy.

A cannula three sizes larger than the number of weeks of pregnancy up to 9 weeks is considered to be optimal; for pregnancies of 10 to 12 weeks the maximum size, 12, is used. The use of smaller cannulas than those indicated increases the time of evacuation, blood loss directly related to this factor, as well as chances of retention of tissue, but may have to be accepted in cases where optimal dilatation is impossible because of risk of cervical tearing.

After dilatation to the appropriate extent the straight vacurette is inserted beyond the internal os and the machine switched on. Ordinarily a pressure of 65 cm. Hg is used. Almost immediately amniotic fluid, placenta and fetal parts can be seen passing through the tube; the vacurette is rotated slowly and pushed up and down within the uterus so that the whole of the uterine cavity is subjected to aspira-

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* Fraser Sweatman analgesic machine with quantiflex head (Canada Dental Co. Ltd., Montreal, Que.)

**Rocket of London Inc., New York, N.Y.

†Berkeley Tonometer (Standard Hospital Supply Ltd., Calgary, Alta.)

tion. When nothing remains to be removed the operator feels a peculiar tightness around the cannula; pressure is then released and the vacurette withdrawn completely. The metal curette is then used gently, and finally the curved cannula to remove debris and parts that may have been missed by the first suction and dislodged by the scraping. The metal curette is used here only as an adjunct to ensure that nothing remains attached to the uterine wall. The method could therefore be described as a vacuum suction curettage.

Some physicians[1,2] use suction alone for all their cases; others follow this with curettage routinely[3,4,6,10] or occasionally.[12] The author considers the additional suction after curettage the best way to ensure complete evacuation; since our adoption of this technique, retention of uterine contents and the need for repeat curettage has been rare.

The contents of the bag containing the removed tissues are routinely checked by the nurse. In pregnancies of 11 to 12 weeks the fetal head often remains behind. When any fetal part is found missing re-aspiration is performed; occasionally forceps have to be used for this purpose.

Oxytocics are used parenterally only in case of excessive bleeding during or after evacuation, not routinely.

The average time to complete an abortion by the above-described method is four to six minutes. The least time is required for pregnancies of six to eight weeks in multiparas with easily dilatable cervices; pregnancies of four to six weeks in nulliparas with difficult cervices may take longer. In pregnancies of 10 to 12 weeks evacuation of the uterus requires more time. Seldom does the procedure last more than 15 minutes.

The average blood loss varies according to the number of weeks of gestation but is, in general, minimal. Although no quantitative studies of blood loss have been done in our clinic we can confirm those of other authors[1,4-6,8-10] which show a marked decrease in blood loss compared with the traditional D & C, especially marked between 8 and 12 weeks.

Postoperative care

Immediately after the operation most patients experience tremendous relief at no longer being pregnant and pleasant surprise at the rapidity of the procedure and their feeling of well-being.

Within two minutes the patient is instructed to sit up and then walk downstairs with the nurse to the recovery room. She is kept under observation for an average of 30 minutes and leaves the clinic when ambulatory. Some patients feel so well they wish to leave immediately; others require up to two hours of rest and care. Never was a patient unable to walk up the few steps from the recovery area, nor was a stretcher ever required.

Antibiotics are routinely given — ampicillin 250 mg. *qid* for four days or, for those allergic to ampicillin, tetracycline in equivalent dosage.

Table I — Complication rate in 5641 cases*

	No. of cases	%
Hemorrhage	6	0.105
Perforated uterus	2	0.035
Incomplete abortion (retained tissue)	14	0.25
Infection (T > 102°F.)	20	0.35
Lacerated cervix	0	
Other (depression)	1	0.018
Number of hospitalized cases	27	0.48

*Complications in a single case were reported occasionally under more than one category, e.g. hemorrhage, incomplete abortion and infection.

Ergonovine in tablet form for two or three days is given only to patients whose gestation has exceeded eight weeks' duration or when it is felt to be justified by other factors (multiparity, poor uterine tone, excessive postabortal bleeding). Its postoperative administration in all cases appears unwarranted.

Pain due to uterine contractions following evacuation may be absent or vary from very mild to severe; it is of short duration and propoxyphene HCl (Darvon®) is given for relief.

Nausea and vomiting following operation occur in some cases; this may be due to the pregnancy itself, the stress involved or the uterine cramps. Its management presents no difficulty.

Contraception is discussed with all patients prior to the abortion. The oral contraceptive, when prescribed, should be started five days after the operation. Intercourse is forbidden for 10 to 14 days.

A routine check-up within two weeks is recommended.

Some problems

Fainting or shock

Despite all precautions, rarely a patient may faint or go into shock. When this happens the procedure is immediately halted and the heart stimulated by vigorous pounding on the sternal area. Usually the patient responds within a few seconds and the operation can then be completed. It is less likely to develop if measures are used to reduce anxiety and pain, and if dilatation is performed slowly and gently.

The atropine injected during the intracervical block not only prevents bradycardia and shock due to cervical dilatation, but it is also believed to have a softening effect on the cervix, thus facilitating dilatation.

Low placental implantation

In some cases as soon as dilatation is initiated blood begins gushing. This is usually due to a low-lying placenta and the spurting may continue until suction is started. It is essential to complete dilatation as swiftly as possible while disregarding the blood loss; since the hemorrhage rarely lasts more than a minute the amount of blood lost is not great, and the procedure can be completed easily without risk.

Previous cesarean sections

Some physicians refuse to perform vacuum aspiration on patients who have had one or more cesarean sections. At the time of writing the author has performed about 200 suction curettages on women who have had one or even two previous cesarean sections and there has not been a single case of complications. Additional precautions are taken, however, i.e. the negative pressure used is reduced from 65 to 45 cm. Hg and the anterior wall of the uterus is not subjected to suction; the metal curette is therefore used more vigorously on the anterior wall. The danger of sucking in a weakened uterine wall or producing a tear in it is thereby kept to a minimum.

Complications

In order to evaluate the complication rate of the procedure a questionnaire was sent to physicians and agencies referring patients over the last few years. Reports were received on 5641 cases (Table I).

Since patients were instructed to consult their referring physician within two weeks after operation and since most physicians routinely handling postoperative complications responded, the reported complication rate is considered to have a high degree of accuracy. Further, the agencies referring patients had a policy of follow-up and received in-

formation in the event of complications; records from these two sources may thus reflect some duplication of results. A patient with retention of uterine contents and fever may be reported as having two complications when in fact these are two factors of the same condition; on the other hand, some complications may have gone unreported to the physicians or agencies polled.

Mortality has been nil. A total of 27 patients (0.48%) were reported to have been hospitalized. No patients of all reported cases required hysterectomy; all complications were successfully treated and recovery was complete.

Hemorrhage

Hemorrhage is a very rare complication of the vacuum suction technique and the author has not encountered a single case in the last two years. The very few cases of hemorrhage which occurred were usually in pregnancies of 12 to 14 weeks. Although cases over 12 weeks are not accepted, occasionally misrepresentation of the history results in an incorrect assessment of length of pregnancy which physical examination is unable to disprove.

No case of hemorrhage following evacuation was serious enough to require immediate hospitalization; all were controlled by injections of oxytocics, uterine massage, or a combination.

In those cases where it was realized the pregnancy was too advanced to be completed in clinic the patient was directed to hospital.

The incidence of hemorrhage, 6 out of 5641 (0.105%), compares very favourably with most studies, which report 1 to 6%;[5,7-10] Nathanson[12] reports an incidence of 0.24%. The only study reporting a slightly lower rate of hemorrhage is that of Walton:[13] 0.09% in 4222 cases.

Uterine perforation

Uterine perforation is one of the potentially most serious complications of abortion. The vacuum suction technique, correctly used, is certainly much safer in avoiding perforation than the D & C.

Perforation was reported in only two cases (0.035%). This is a slightly lower incidence than that reported by Beric and Kupresanin[9] on 23,000 cases and considerably lower than most others. (Vojta,[1] however, reports no perforation in 4000 cases.) Nathanson[12] reports a rate of 0.14%, Walton[13] 0.19%, Loung, Buckle and Anderson[5] 0.5%, Brenner, Kirshen and Didio[8] 1.2%. The perforations that did occur were mainly caused by the sound or dilator and had no serious sequelae since they were immediately recognized and were caused by blunt instruments which did not lacerate surrounding tissues.

Incomplete abortion

Most cases of incomplete abortion occurred early in practice before adoption of the technique of suction-curettage-suction. The routine utilization of this sequence has virtually eliminated retention of uterine contents. Other factors ensuring complete evacuation are the high-powered aspirator, the shortened speculum and greater experience. Retention tends to occur in cases where the flexible uterus is retroverted and markedly retroflexed; the use of metal curettes that can be bent in such a way as to reach those areas to which access is otherwise difficult has largely overcome this problem.

The 14 cases of incomplete abortion represent 0.25% of the total, as compared with 0.35% in Nathanson's study[12] and 1.3% in the studies of Loung, Buckle and Anderson[5] and Beric and Kupresanin.[9]

Infection

Most cases of infection are the result of incomplete abortion with retention of uterine contents, but some may occur apart from this complication.

Since fever and infection are late complications of abortion and standards of what constitutes infection vary, it is difficult to make comparisons regarding this complication. For the purpose of this study infection was inferred when fever in excess of 102°F. occurred; 20 such cases were reported (0.35%). This incidence compares favourably with the studies of Nathanson[12] (1.5%), Loung, Buckle and Anderson[5] (1.2%), Strausz and Schulman[7] (3.6%) and Brenner, Kirshen and Didio[8] (4.3%). The low incidence of fever and infection is attributed to a perfected technique, low incidence of retention and the routine postoperative use of antibiotics.

Lacerated cervix

No cases of lacerated cervix were reported. Some lacerations did, however, occur initially. That none were reported may be attributed to the fact that most physicians examining patients after an interval of two weeks or even a few days would not be able to detect minor lacerations since they heal so well.

No lacerations have been encountered for over two years now. This is attributed to use of good instruments and technique.

Depression

Only one case of depression has been reported by a physician under "other complications"; this extremely low incidence of postabortal depression is very significant and is borne out by many contemporary studies on the subject.

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